Improvements Are Needed in the Telecommunications Data Network Management Program

November 2001

Reference Number: 2002-20-026

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INSPECTOR GENERAL
for TAX
ADMINISTRATION

DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

November 30, 2001

MEMORANDUM FOR DEPUTY COMMISSIONER FOR MODERNIZATION & CHIEF INFORMATION OFFICER

FROM: Pamela J. Gardiner
Deputy Inspector General for Audit

SUBJECT: Final Audit Report - Improvements Are Needed in the Telecommunications Data Network Management Program (#200120007)

This report presents the results of our review of telecommunications data network management and capacity planning. The overall objective of the audit was to determine whether the Internal Revenue Service (IRS) Information Technology Services (ITS)[1] organization effectively implemented telecommunications data network[2] capacity and performance management policies and procedures.

The ITS Telecommunications Division is responsible for purchasing, operating, and maintaining networks for more than 100,000 employees in over 750 locations. Several actions have been initiated to accomplish the strategic goal of improving the IRS' ability to manage telecommunications services. These actions include upgrading telecommunications technology, developing network performance measures, and initiating service level agreements defining the network performance to be provided to users. Additional actions in the following areas would further improve the network management program.

Network management policies and procedures do not provide defined network monitoring responsibilities. As a result, duplicative monitoring activities may be costing the IRS about $1 million a year. Additional network management program weaknesses include network monitoring tools that cannot access all wide area network equipment,

[1] Effective March 30, 2001, the IRS' Information Systems organization was renamed ITS.

[2] Referred to as "network" in the report.

the lack of defined network problem resolution timeliness standards, and the lack of periodic identification of recurring network problems. Also, network traffic is not proactively analyzed to optimize network performance. For example, about 10 percent of the traffic routed through the Internet firewall, such as Internet advertisements, could be eliminated. Improving network management efforts would ensure the IRS effectively uses resources and maintains a reliable network that meets users' needs.

IRS policies and procedures do not require network capacity planning and the use of analytical modeling techniques when planning major network changes that could affect current network capacity and performance. Due to ineffective network capacity planning efforts, network traffic volumes on 12 of 306 upgraded circuits used less than 10 percent of the circuits' capacity, and 37 upgraded circuits that cost approximately $1.9 million to install were disconnected after being used for only 1 to 11 months.

In addition, change management procedures designed to maintain network integrity and security were not followed. During September through November 2000, 14 of 28 Change Management Tracking System (CMTS) records did not include documented management approval and/or test results, and all 132 Treasury Communications System[3] (TCS) service requests were not documented on the CMTS as required. Also, change management computer software was not implemented to enhance oversight procedures.

Management's Response: IRS management agreed with the recommendations presented in the report. Corrective actions taken and planned will improve network monitoring and performance, capacity planning, and change management procedures. Management's complete response to the draft report is included as Appendix V.

Copies of this report are also being sent to the IRS managers who are affected by the report recommendations. Please contact me at (202) 622-6510 if you have questions or Scott Wilson, Assistant Inspector General for Audit (Information Systems Programs), at (202) 622-8510.

[3] The Department of the Treasury's TCS provides Federal Government agencies a selection of network services, including design, implementation, management, operation, maintenance, and enhancement. The services are provided through contracts with telecommunications service vendors.

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Background

The Fiscal Year (FY) 2001 – 2002 Internal Revenue Service (IRS) Information Technology Services (ITS)[1] Strategy and Program Plan includes a strategy to "Improve IRS' Ability to Manage Telecommunications Services." To accomplish the strategy, the ITS function plans to leverage technology, implement organizational change, adopt best practices, and invest in its employees.

The ITS Telecommunications Division had a $139 million FY 2001 budget to provide data services to more than 100,000 employees in over 750 locations. The Telecommunications Division will pay Treasury Communications System (TCS)[2] contractors $80 million (58 percent of the data services budget) for Wide Area Network (WAN)[3] operations and maintenance services. Approximately $59 million will be spent on Department of the Treasury and TCS fees, services, and Program Management Office (PMO)[4] support; the IRS National Network Management Center (NMC) contractor support; the purchase and maintenance of IRS-owned data network[5] equipment; and other costs.

The Telecommunications Division organizations with network responsibilities include:

- The WAN Office – Purchases and installs WAN circuits and equipment.
- The National NMC – Monitors, troubleshoots, and tests the WAN.

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[1] Effective March 30, 2001, the IRS' Information Systems organization was renamed ITS.

[2] The Department of the Treasury's TCS provides Federal Government agencies a selection of network services, including design, implementation, management, operation, maintenance, and enhancement. The services are provided through contracts with telecommunications service vendors.

[3] A WAN connects distant facilities (e.g., IRS computing centers to IRS centers, IRS centers to local offices).

[4] The PMO manages the TCS contract and oversees the TCS contractors.

[5] Referred to as "network" in the report.

- The Telecommunications Engineering and Project Management Office – Designs network changes and develops performance measures.

In addition, computing center, IRS center, and area office ITS employees monitor, troubleshoot, and test the WAN and Local Area Networks (LAN)[6] to assure network availability. These employees currently are assigned to the Corporate Computing, Service Center Operations, and Desktop Management offices.

The International Organization for Standardization (ISO)[7] established information technology standards that apply to data communication networks. Telecommunications management informed us that they are working to achieve key network management functions recommended by the ISO, including:

- Fault management – Monitoring and controlling the network to ensure that a problem in one location does not disable the remainder of the network.
- Configuration management – Controlling network changes to ensure that all changes are authorized.
- Performance management – Monitoring and controlling the network to meet the users' quality of service needs (i.e., timeliness, availability, and reliability).

Audit work was conducted in the ITS National Headquarters; Martinsburg Computing Center (MCC); Tennessee Computing Center (TCC); Atlanta, Austin, and Memphis IRS Centers; and Midstates and Southeast Area Offices during November 2000 through July 2001. This audit was scheduled as part of the Treasury Inspector General for Tax Administration's (TIGTA) Annual Audit

[6] LANs generally are contained within a facility and connect users with each other and the WAN.

[7] The ISO is a non-governmental organization established to promote the development of standardization and related activities in the world with a view to facilitating the international exchange of goods and services and to developing cooperation in the spheres of intellectual, scientific, technological, and economic activity.

Plan and performed in accordance with *Government Auditing Standards*. Detailed information on our audit objective, scope, and methodology is presented in Appendix I. Major contributors to the report are listed in Appendix II.

Actions Were Initiated to Accomplish the Telecommunications Strategic Goal

Telecommunications management recognized that accomplishment of the strategic goal to improve the IRS' ability to manage telecommunications services required improvements in network performance and management. The actions initiated to improve the network include:

- Replacing older WAN circuits with current technology and redesigning the WAN configuration to increase capacity, and improve network management, problem resolution, and performance.
- Developing network performance measures that support the IRS' Balanced Measures.[8]
- Initiating development of service level agreements with IRS business units that will document the network service levels that users will be provided.
- Developing the Enterprise Help Desk, a new system that should improve network problem reporting.

Additional management actions in the following areas would further improve the network management program.

Network Management Efforts Could Be Improved

Office of Management and Budget (OMB) Circular A-130, *Management of Federal Information Resources*, requires management to ensure that networks are cost effective. The OMB Circular also requires management to record and maintain sufficient information to ensure management and accountability of programs and to protect the IRS' legal and financial rights. The ISO standards state that the fault management function includes reacting to and correcting problems as soon as possible to minimize the impact on the entire network. The performance management function

[8] The IRS' approach to modernization includes instituting Balanced Measures, such as ITS performance measures and diagnostic indicators (e.g., Systems Response Time, Percent Systems Availability, etc.).

includes monitoring and controlling the network to meet the timeliness, availability, and reliability requirements of users.

The IRS has not implemented nationwide policies and procedures for network monitoring responsibilities, established problem resolution timeliness standards, and documented traffic and performance analyses. Management advised us that these policies and procedures were not implemented because their immediate priority was upgrading the network infrastructure and completing the ITS reorganization. Increased management attention to the following areas would improve network management effectiveness and allow staff resources to be assigned to work that is more productive.

Network monitoring efforts are duplicated and network monitoring tools cannot access all equipment

Current network monitoring procedures do not establish nationwide network monitoring responsibilities, resulting in duplicate network monitoring and the inability of network management tools to electronically access all WAN equipment.

- The NMC, MCC, and TCC network monitoring operations are staffed around the clock and monitor the network to identify problems. Twenty-nine MCC and TCC Telecommunications Specialists (IRS employees) and 20 NMC Network Engineers (IRS contractors) monitor the WAN and troubleshoot and report problems. Review of the IRS employees' and contractors' duties showed that 22 of the 29 MCC and TCC employees' duties duplicated the NMC Network Engineers' duties. By eliminating the overlapping duties, management could reassign the 22 employees to other duties resulting in $4.8 million in resources being put to better use over 5 years (see Appendix IV for details on our calculation of the cost).

  Management stated that the NMC is going to be moved to a computing center. The Telecommunications Division has recently assembled a team of managers that is looking at various alternatives for this move including the possibility of implementing a distributed network

monitoring process. In addition, the IRS' systems modernization and consolidations at the MCC and TCC have increased their network responsibilities.

- MCC and TCC employees and NMC and TCS contractors use similar electronic tools to monitor the WAN. These electronic tools identify each circuit and piece of equipment that makes up the network and monitor the network to detect problems (e.g., interrupted service and slow response times). The accuracy and completeness of this information is critical because employees and contractors review the problem alerts generated by the tools and network diagrams to troubleshoot problems and determine the appropriate corrective actions.

  However, the NMC and TCS tools could not electronically access all WAN circuits and equipment. NMC employees explained that their access was limited because employees in local IRS offices had not shared with them the network equipment access codes.

  As of March 2001, the TCS contractor had completed 10 network diagrams for 2 of the 8 offices selected for the audit. The diagrams identified 137 WAN circuits but did not provide all of the information (e.g., destination names) needed to manage 46 of the circuits. Telecommunications management subsequently advised us that NMC engineers completed detailed network diagrams for approximately 90 percent of the WAN, but their tools' access to the remaining network equipment is still limited. Problems that occur after local office business hours in locations that cannot be monitored by the NMC and TCS contractors may not be identified promptly, which could delay resolution and prevent employees from conducting their work when they return the following day.

Network problem resolution timeliness standards have not been defined and incorporated into the status reporting process

Network problems are resolved by TCS and NMC contractors and IRS employees. The TCS contract defines

performance standards, including various time periods for restoring interrupted service, and the TCS contractor is required to design, implement, operate, and maintain the network to meet the standards selected by the bureaus (e.g., IRS). However, the IRS has not established problem resolution timeliness standards for the TCS contractor and the IRS employees and NMC contractors who resolve problems.

The TCS contract minimum standard requires the contractor to restore interrupted service within 8 business hours (or 1 business day). The minimum TCS standard was applied in a review of 91 problem tickets[9] randomly selected from the 457 problem tickets recorded on the NMC's Log Management System (LMS)[10] between September and November 2000.[11] The results of the review show that improvements are needed to more timely resolve network problems (see Table 1).

Table 1: Timeliness of Network Problem Resolution (in Business Days)

Problem Resolved By:	0 – 1	1 - 2	2 - 5	Over 5	CND	Total
TCS	55	11	7	4	1	78
IRS and NMC	7	2	0	2	2	13

Source: Sample of 91 of 457 problem tickets recorded on the LMS between September and November 2000.

Note: CND (Could Not Determine) - Three problem tickets and the associated documentation did not show the resolution dates and times.

NMC procedures require contractors to prepare daily Network Event Status Reports for Telecommunications management that include all unresolved and recently

[9] Problem tickets contain detailed information about a problem (e.g., date, time, location, description, actions taken, etc.) that is needed to troubleshoot, follow up on, and maintain a historical record of the problem.

[10] The LMS is the database used by the NMC to record and track problem tickets.

[11] See Appendix I for details about the sampling methodology.

resolved network circuit problems. Management advised us that they discuss unresolved problems identified in the status reports with the Department of the Treasury TCS PMO and contractors in monthly meetings. The 91 sampled problem tickets were also reviewed to determine whether the problems were reported in the daily Network Event Status Reports. The review found that improvements are needed to ensure problems are reported in the Network Event Status Reports (see Table 2).

Table 2: Problems Not Reported in the Network Event Status Reports

Problem Resolved by:	Problems Not in Status Reports	Total Problems Reviewed
TCS	41	78
IRS and NMC	4	13

Source: Sample of 91 of 457 problem tickets recorded on the LMS and Network Event Status Reports between September and November 2000.

Timely resolution of network problems is important to ensure the network remains operational and meets the needs of users. Also, accurately preparing status reports assures management is aware of network problems, has the necessary information to assign the appropriate resources to address the problems, and has complete information when meeting with the PMO and contractors.

Analyses of recurring network problems are not periodically performed

Telecommunications management advised us that they analyze problem tickets to identify circuits with recurring problems (i.e., two or more problems occurring in a short period of time), which helps them ensure that recurring problems are properly resolved. However, management provided documentation of only one IRS analysis of recurring problems, dated September 2000, that was submitted to the PMO.

The analysis listed nine circuits with recurring problems, and the PMO subsequently reported back to Telecommunications management that a TCS contractor was working on one chronic circuit (a circuit that has four or more problems in the month) and would continue to monitor

three others. In addition, the TCS contractor prepares monthly TCS Trouble Ticket System (TTS) Reports[12] that identify chronic problems, but the TTS Reports were not timely received by the IRS. As of July 2001, the TTS report dated September 2000 (covering problems that occurred in August 2000) was the most recent report that the IRS received.

Periodic IRS analyses would have identified additional circuits with recurring problems. A review of the 457 problem tickets recorded on the LMS between September and November 2000 identified 40 circuits with 2 to 5 problems that occurred after the September 2000 IRS analysis, including:

- One circuit with 5 problems reported in 28 days.
- One circuit with 4 problems reported in 12 days.

NMC procedures do not require periodic analysis of network problems. However, effective network performance management should incorporate periodic problem analyses to ensure the network is available and reliable in meeting users needs.

Network traffic is not analyzed to identify optimization opportunities

Telecommunications management has not issued policies and procedures requiring periodic analysis of network traffic to identify optimization opportunities. If network traffic is reviewed and results shared with other organizations that could resolve the identified problems, network performance could be improved.

[12] The TTS Report (DRD-031) includes IRS specific analyses of the problem tickets opened in the previous month (e.g., timeliness of resolution, recurring problems, etc.).

For example, our analysis of the IRS Internet firewall audit logs[13] for September through November 2000[14] identified unnecessary traffic that wasted network resources, including:

- Internet advertisements that accounted for 123 billion of 1,449 billion bytes (8 percent) of traffic through the firewall. In response to this analysis, the Telecommunications Division began implementing controls that block Internet advertisements. Management's action will conserve network resources and result in improved network response times.
- Misrouted IRS Intranet traffic (e.g., traffic with sources and destinations on the IRS internal network was routed through the external Internet firewall) that accounted for 25 billion of 1,449 billion bytes (2 percent) of traffic through the firewall. The vast majority of the sources appear to be IRS employees' workstations. However, the sources for 19 percent of the misrouted traffic were 5 network devices, including 3 proxy servers used to route users' traffic to the correct destination address.

Periodic traffic analysis by Telecommunications Division personnel may also identify other low-cost opportunities to further improve the network's effectiveness. Although Telecommunications management advised us that they are not responsible for the settings on systems and desktop computers connected to the network, they are responsible for the efficiency of the network and communicating the results of proactive analyses to the organizations that are responsible for the equipment. By sharing pertinent information and taking necessary corrective action, network

[13] The IRS collects data about every transmission that crosses the firewalls, including the IRS source or destination addresses and Internet web addressees. The data are stored in computer files (also called audit logs) for future analysis.

[14] The Internet firewall traffic accounting data were incomplete because the Telecommunications Division did not collect all data for 32 of the 91 days in the period. The missing data were reported in the TIGTA audit report *Controls Over the Internet Gateway Should Be Improved to Better Deter and Detect External Attacks* (Reference Number 2001-20-101, dated June 2001).

resources could be conserved and network response times improved.

Recommendations

The Deputy Commissioner for Modernization & Chief Information Officer should:

1. Establish WAN monitoring responsibilities that eliminate duplicate monitoring efforts and reassign employees displaced by revised network monitoring responsibilities to more productive work.

Management's Response: Management plans to review IRS network management capabilities and implement the necessary organizational, contractual, and procedural changes to complete realignment of responsibilities and functions.

2. Issue instructions to ensure network monitoring tools can electronically access all WAN equipment.

Management's Response: Management plans to complete the deployment and refinement of the network management tools.

3. Define problem resolution timeliness standards for telecommunications contractors and employees and monitor the resolution of reported problems.

Management's Response: Management plans to review the problem identification process and align it with industry best practices. A procedural guide will be developed to assist network monitors to determine the severity of an outage. The guide will also assist in providing network restoration timelines. Furthermore, management will establish a process to periodically review trouble handling.

4. Incorporate problem resolution timeliness standards into the Network Event Status Report and ensure all problems are included in the daily status report.

Management's Response: Management plans to continue to work with the Department of the Treasury and the TCS vendor to assess problem resolution responsiveness and timeliness. Also, management plans to use the Enterprise

Help Desk and the Information Technology Asset Management System (ITAMS) network problem reporting and tracking procedures to improve problem resolution. Furthermore, network outages will be documented and compared to Service Level Agreement standards currently being developed.

5. Conduct and document monthly network problem analyses to identify recurring problems.

Management's Response: The Telecommunications Division established a monthly forum with the Department of the Treasury and TCS vendors to discuss network management issues, including chronic network problems. Management also plans to partner with the Department of the Treasury and TCS vendors to analyze and resolve root causes for repetitive problems.

6. Complete efforts to block Internet advertising.

Management's Response: The Telecommunications Division prepared a plan to filter Internet traffic and block Internet advertisements. Management is also working to procure the needed hardware and software.

7. Require periodic network traffic analyses and initiate corrective actions or communicate the results with responsible organizations.

Management's Response: The Telecommunications Division is establishing a capacity planning staff and working with the Business System Modernization Program Office (BSMO) to use an analytical modeling tool to baseline the current network and assist in periodically analyzing network traffic.

Network Capacity Planning Could Be Improved

The *Treasury Information Technology Manual*, TD P 81-10, requires bureaus (e.g., the IRS) to implement planning processes that ensure investments reduce costs and improve the effectiveness of work processes. Analytical modeling is a capacity planning technique that uses historic network performance data and future requirements to simulate the proposed network changes and estimate their impact on network performance. IRS policies and procedures do not require network capacity planning and the use of analytical

modeling techniques when planning major network changes that could affect current network capacity and performance.

The IRS purchased analytical modeling computer software and a Business Systems Modernization[15] contractor is using it to help determine the future network capacity changes needed for the IRS' future tax processing and compliance systems. However, the ITS function has systems development initiatives, such as the Tier II Consolidation Project[16] and the National Print Strategy,[17] that will significantly change current network traffic volumes and patterns and analytical modeling techniques were not being used. These modeling techniques were not being used by the ITS function because management had not allocated resources to train Telecommunications engineers or hired contractors with the required skills. Telecommunications management advised that, in May 2001, they started using modeling techniques to plan network changes for the employee travel reporting system that is part of the Tier II Consolidation Project.

Weekly TCS circuit performance reports were analyzed to evaluate the effectiveness of capacity planning. Analysis of the peak traffic volume reports for February 2001 showed that some upgraded circuits and associated ports[18] might have been sized incorrectly. Specifically:

- Twelve of 306 WAN circuits never used more than 10 percent of the available capacity during the entire month; a pattern indicating the circuits might be

[15] The IRS' Business Systems Modernization Program will modernize the IRS computer systems by applying new technologies to the IRS' business processes.

[16] The Tier II Consolidation Project will move IRS tax processing, compliance, and management computer systems that currently run on mid-range computers located in IRS centers and local offices to consolidated systems at the computing centers.

[17] The National Print Strategy will consolidate the IRS' high volume taxpayer notice printing operations in two locations.

[18] A port is the physical connection to the WAN where signals enter and leave the local network.

oversized. Of these 12 circuits, 10 connected computing centers and IRS centers with each other or large offices.

- Sixteen of 68 ports discarded traffic on 2 or more occasions during the month when the network traffic exceeded the ports' capacity, a pattern indicating that the ports might be undersized. As a result, users could experience screen errors or slow response times.

In addition, the WAN circuit inventory identified 37 circuits that were upgraded to current technology between January and November 2000 at a cost of approximately $1.9 million. These circuits were disconnected in December 2000, after being used for only 1 to 11 months, when the IRS reconfigured the WAN (see Appendix IV for details on our calculation of the total installation costs). Telecommunications management informed us that this sequence of events occurred because TCS contractors did not complete their work timely and the IRS placed a moratorium on network changes during the tax filing season. However, improved network capacity planning may have prevented the purchase of circuits that were abandoned within a year after installation.

By not having policies and procedures requiring network capacity planning and the use of analytical modeling techniques, the IRS is at risk of wasting resources and building a network that does not meet users' needs.

Recommendations

The Deputy Commissioner for Modernization & Chief Information Officer should:

8. Issue and implement capacity planning policies and procedures for major network changes.

Management's Response: The Telecommunications Division is establishing a capacity planning staff and developing a capacity planning policy and procedural guide for performing quarterly capacity planning studies. The Telecommunications Division is also working with the BSMO to use an analytical modeling tool to baseline the

current network and assist in the required capacity planning work.

9. Ensure analytical modeling techniques are incorporated into network and system development planning methodologies.

Management's Response: The Telecommunications Division is establishing a capacity planning staff to use the modeling techniques and is working with the BSMO to use an analytical modeling tool to baseline the current network and assist in the capacity planning and modeling effort.

Change Management Controls Should Be Enforced

The IRS' WAN is used to access taxpayer accounts and to transmit tax return and payment information among the many IRS locations. The IRS annually assists about 128 million taxpayers and processes about 233 million tax returns and $2.1 trillion in payments. To maintain network integrity and security, the IRS requires all IRS employees and contractors implementing network changes to follow the *Change Management Procedure for IRS Network Management* (CMP). In addition, the Change Management Tracking System (CMTS) is to be used for documenting network changes including management approvals, test plans, and completed tests.

However, as of July 2001, Telecommunications management had not implemented oversight procedures to ensure that employees and contractors followed the CMP. A review of all 28 network change management requests recorded on the CMTS and all 132 requests to the TCS PMO for network changes that were approved by the PMO and/or completed by contractors between September and November 2000 determined that:

- Fourteen of the 28 CMTS records do not show that changes were properly approved and/or tested before the changes were implemented.
- None of the 132 TCS service requests were recorded on the CMTS and, therefore, the CMTS does not show that the changes were properly approved and/or tested before they were implemented.

In addition, computer software, designed to allow only authorized employees and contractors to implement network changes and to record on a computer file who accessed the equipment and what changes were made, has been purchased but not implemented because of problems identified during testing. However, when implemented, the software will work on only one vendor's equipment. Management has been unsuccessful in identifying software that would provide the same control over other vendors' equipment. Management also had not established who would be responsible for reviewing the computer files and taking action on unauthorized changes.

Without effective oversight of network changes and the implementation of electronic access tools, management cannot ensure network equipment changes are authorized and that network integrity and security are maintained.

Recommendations

The Deputy Commissioner for Modernization & Chief Information Officer should:

10. Implement management oversight procedures to ensure that employees and contractors follow the CMP.

Management's Response: Management plans to issue the Change Management Tracking System document to establish procedures for making changes to the operational network and implement access control software for one vendor's network devices.

11. Enhance change management oversight by:

    a. Implementing the change management computer software already purchased.

    b. Identifying, purchasing, and implementing software that is compatible with other vendors' hardware.

    c. Revising the CMP to establish responsibility for reviewing change management records and

taking corrective actions on unauthorized changes.

Management's Response: Management plans to issue the Change Management Tracking System document to establish procedures for making changes to the operational network, implement access control software for one vendor's network devices, and research the availability of tools for other vendors' network devices and recommend the appropriate purchases.

Appendix I

Detailed Objective, Scope, and Methodology

The overall objective of this audit was to determine whether the Internal Revenue Service (IRS) Information Technology Services (ITS)[1] organization effectively implemented telecommunications data network[2] capacity and performance management policies and procedures. To accomplish the objective, we:

I. Reviewed IRS network management policies, procedures, and performance measures to determine whether they are comprehensive and provide guidance to local and National Headquarters network management personnel.

A. Reviewed National Network Management Center's (NMC), Martinsburg and Tennessee Computing Centers'; Atlanta, Austin, and Memphis IRS Centers'; and Midstates and Southeast Area Offices' network monitoring procedures to determine whether they:

1. Established consistent responsibilities for network monitoring that do not overlap or leave gaps in coverage.

2. Provided consistent procedures for monitoring and problem reporting.

3. Established criteria, thresholds, and procedures for elevating to high-level IRS management and/or the Treasury Communications System (TCS) Program Management Office (PMO)[3] in the Department of the Treasury problems that are not resolved timely or that reoccur with some frequency.

B. Reviewed network capacity planning procedures to determine whether they:

1. Established responsibility for conducting capacity planning activities.

2. Established procedures for proactive analyses based on performance statistics, periodic reporting of the results, and elevating the results to appropriate management levels.

[1] Effective March 30, 2001, the IRS' Information Systems organization was renamed ITS.

[2] Referred to as "network" in the report.

[3] The Department of the Treasury's TCS provides Federal Government agencies a selection of network services, including design, implementation, management, operation, maintenance, and enhancement. The services are provided through contracts with telecommunications service vendors. The PMO is responsible for contractor oversight.

3. Established responsibility and procedures for identifying telecommunications network requirements during the planning phase for system development projects and determining the impact the requirements will have on network capacity and performance.

C. Reviewed the *Change Management Procedure for IRS Network Management*, revised September 2000, to determine whether it:

1. Required controls for all network changes.

2. Required management and technical reviews and approvals.

3. Required testing of all changes.

D. Reviewed the Telecommunications Division network performance measurements to determine whether:

1. They measured telecommunications program and improvement goals.

2. They are relevant to users' requirements and expectations.

3. The information supporting the measurements is readily available and the measurements are properly recorded.

E. Obtained organization and staffing charts from the NMC, Martinsburg and Tennessee Computing Centers; Atlanta, Austin, and Memphis IRS Centers; and Midstates and Southeast Area Offices to determine the resources that these locations assigned to do the network management activities.

II. Reviewed a sample of problem tickets to determine whether network performance monitoring capabilities were implemented and problems that performance monitoring activities identified were resolved.

A. Sampled and tested problem tickets to determine whether problems were resolved timely.

1. Identified and downloaded to Treasury Inspector General for Tax Administration computers the 457 problem tickets recorded on the NMC Log Management System (LMS) between September 1 and November 30, 2000. Determined that the population contained problems with differing characteristics (e.g., circuit and non-circuit problems, and problems resolved by IRS employees, NMC or TCS contractors). The electronic data were validated by determining that the LMS numbered the problem tickets sequentially and verifying that the computer file contained all problem ticket numbers.

2. Due to the varying characteristics of the problem tickets, we decided not to project the results over the population. Therefore, we selected a

judgmental sample of 91 problem tickets (interval sample of every fifth ticket) with a randomly selected starting point. A copy of the Integrated Network and Operations Management System (INOMS) record associated with each sample problem ticket was also obtained to complete the IRS information.

3. Using the LMS and INOMS information, measured the resolution time for each sampled problem ticket in business days from the date and time each problem was recorded until it was resolved and stratified the results (e.g., 0 – 1, 1 – 2, 2 – 5, and over 5 business days). For this analysis, we assumed that each location's business hours were 8:00 AM to 5:00 PM, weekdays only, and that problems should be resolved within 8 business hours (1 business day), the minimum TCS contract standard.

4. Reviewed each sampled problem ticket that was not resolved within 1 business day to determine whether the problem ticket was included on daily Network Event Status Reports. Also, unresolved problem escalation procedures were discussed with Telecommunications Division managers.

B. Reviewed the 457 LMS problem tickets (selected in Test II.A.) to identify equipment and circuits with multiple events reported between September and November 2000. The problem tickets were reviewed to determine whether duplicate reporting occurred or repetitive problems were elevated to appropriate management levels for attention.

1. Reviewed the 457 LMS problem tickets and associated INOMS records to determine whether duplicate tickets were prepared and the cause was determined.

2. Reviewed the LMS problem tickets and associated INOMS records for circuits and equipment with multiple events to determine the time periods they occurred in and whether Telecommunications employees reported them as chronic problems.

3. Reviewed telecommunications documentation associated with repetitive problems to determine whether the problems identified by the auditors were elevated to IRS management.

C. Reviewed available *TCS Trouble Ticket System (TTS) Reports* (DRD-031)[4] to determine whether results were reported for September through November 2000 and reviewed a Telecommunications Division and TCS contractor analysis of chronic problems.

[4] The TTS Report (DRD-031) includes IRS specific analyses of the problem tickets opened in the previous month (e.g., timeliness of resolution, recurring problems, etc.).

III. Reviewed samples of performance statistics and network capacity planning documents to determine whether Telecommunications management implemented proactive capacity planning activities.

A. Obtained Internet firewall log data for September 1 through November 30, 2000. The data identified source and destination addresses, the size of the web objects, and dates and transmission times for each access through the firewall during the period. The data were analyzed for the following information:

1. Misrouted IRS Intranet Traffic – Determined the volume of IRS Intranet traffic (from Intranet address to Intranet address) that is misrouted through the Internet firewalls.

2. Advertising Banners – Determined the volume of data that known Internet advertisers transmitted to IRS addresses through the Internet firewall.

B. Discussed with Telecommunications management how capacity planning analyses are reported and reviewed the one capacity planning document that was produced for the Telecommunications Division[5] to determine whether they:

1. Analyzed network statistics for misrouted IRS Intranet traffic or advertising banners or similar conditions and reported the results.

2. Used performance statistics to evaluate immediate and long-term capacity requirements and to support the business cases for acquisitions.

3. Evaluated the impact on the telecommunications network of system consolidation projects.

C. Reviewed WAN performance reports for February 2001[6], the TCS circuit inventory listing as of March 2001, and TCS Service Request listings for FY 2000 and FY 2001 to evaluate the effectiveness of capacity planning activities.

1. The performance reports identified 306 circuits and 68 ports[7] that carried WAN traffic. Reviewed the performance reports for all circuits and ports to identify traffic volumes that exceeded the circuits' and ports' guaranteed capacity during peak periods or traffic that used less than 10 percent of the capacity.

[5] *Customer Communication System Model, Phase 1 Report*, dated September 2000.

[6] The IRS reconfigured WAN traffic in December 2000, which made previous performance data irrelevant. The test was limited to February 2001 because it was the first month with complete WAN performance information.

[7] A port is the physical connection to the WAN where signals enter and leave the local network.

2. Reviewed the performance reports, circuit inventory, and Service Request reports to identify the WAN circuits that were upgraded in FY 2000 and FY 2001 but were not shown in the February 2001 performance reports and to determine the purchase cost of circuits upgraded and disconnected during FY 2000 and FY 2001.

IV. Reviewed all 28 Change Management Tracking System (CMTS) records created between September 1 and November 30, 2000, and all 132 TCS Service Requests approved by the TCS PMO or completed during the same period to determine whether the *Change Management Procedure for IRS Network Management* was implemented and enforced.

Appendix II

Major Contributors To This Report

Scott E. Wilson, Assistant Inspector General for Audit (Information Systems Programs)
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Appendix III

Report Distribution List

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Appendix IV

Outcome Measures

This appendix presents detailed information on the measurable impact that our recommended corrective actions will have on tax administration. These benefits will be incorporated into our Semiannual Report to the Congress.

Type and Value of Outcome Measure:

- Cost Savings, Recommendations That Funds Be Put to Better Use – Potential; $4.8 million in employee salaries (see page 3).

Methodology Used to Measure the Reported Benefit:

We reviewed information about the Telecommunications Division National Network Management Center (NMC) contractors' and Martinsburg Computing Center (MCC) and Tennessee Computing Center (TCC) employees' network management duties; their network monitoring, problem reporting, and troubleshooting methods; and their Position Description job titles, pay grades, and tours of duty. Based on the employees' pay grades, we estimated the salaries that could be saved if the overlapping network monitoring and problem reporting duties were eliminated.

Total salaries of 29 MCC and TCC employees who monitor Wide Area Network (WAN) circuits (actual grades, estimated step 5), rounded to thousands	$1,283,000
Percent of work hours spent on network monitoring duties (estimated by MCC management)	75 percent
Estimated salary savings ($1,283,000 * 75 percent), rounded to thousands	$963,000
Estimated 5-year savings ($963,000 * 5 years)	$4,815,000
Estimated number of employees (29 * 75 percent), rounded to whole number	22

Type and Value of Outcome Measure:

- Protection of Resources/ Reliability of Information – Actual; $1.9 million spent (see page 11).

Methodology Used to Measure the Reported Benefit:

The Internal Revenue Service's (IRS) WAN circuits were identified by reviewing the WAN circuit performance reports for February 2001, the TCS circuit inventory report as of March 2001, and the IRS Service Request reports for FY 2000 and FY 2001. The Service Request reports also identified the purchase costs. Comparison of the reports identified 37 WAN circuits that were upgraded to current technology between January and November 2000 at a cost of approximately $1.9 million. These circuits were disconnected in December 2000, after being used for only 1 to 11 months, when the IRS reconfigured the WAN.

Appendix V

Management's Response to the Draft Report

DEPARTMENT OF THE TREASURY
INTERNAL REVENUE SERVICE
WASHINGTON, D.C. 20224

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MEMORANDUM FOR TREASURY INSPECTOR GENERAL FOR TAX ADMINISTRATION

FROM: for John C. Reece Dennis Szymanski
Deputy Commissioner for Modernization and
Chief Information Officer

SUBJECT: Management Response to Draft Audit Report –
Improvements Are Needed in the Telecommunications
Data Network Management Program
(Audit No. 200120007)

Thank you for the opportunity to comment on your draft report dated October 5, 2001, concerning the Internal Revenue Service effectively implementing telecommunications data network capacity and performance management policies and procedures.

We concur with your recommendations to improve the management of our Telecommunications Data Network Management Program. We have already initiated several activities that will address your concerns. Policies and procedures are being developed or revised to better manage the increasing demands of the telecommunications services. Since the management of the Data Network is a partnership between the Treasury Department and the Internal Revenue Service, we are strengthening our relationship with Treasury to ensure we are getting the appropriate services through our Treasury Communication System (TCS) contract.

If you have any questions, please call me at 202-622-6800. Members of your staff can call John Mierzeski, Acting Office Manager, Program Oversight and Coordination at 202-283-5987.

Attachment

cc: Associate Inspector General for Audit (Information Systems Programs)
Director, Legislative Affairs

Attachment

Management Response to Draft Audit Report – "Improvements are Needed in the Telecommunications Data Network Management Program" (Audit No. 200120007)

Recommendation #1

The Deputy Commissioner for Modernization & Chief Information Officer should establish Wide Area Network (WAN) monitoring responsibilities that eliminate duplicate monitoring efforts and reassign employees displaced by revised network monitoring responsibilities to more productive work.

Assessment of Cause

This situation developed over several years in the IRS. The rapid changes in telecommunications services and the organization structure created an environment where no single office had clear accountability for the networks common to all IRS offices regardless of their location. This geographic-based organization structure also contributed to the establishment of multiple organizations performing similar functions.

Corrective Actions for Recommendation #1

a. Conduct a comprehensive review of network management capabilities in the IRS and recommend the Modernization and Information Technology Services (MITS) organization be responsible for service-wide networks. This includes organization alignment and physical location.

b. Develop and implement clear guidelines on network management roles and responsibilities in the MITS organization.

c. Implement the necessary organizational, contractual, and procedural changes to complete the realignment of responsibilities and functions.

Implementation Date for Corrective Action #1

		Proposed
a.	Review Network Management.	January 1, 2002
b.	Develop and issue guidelines.	March 1, 2002
c.	Implement changes to complete realignment.	June 1, 2002

Attachment

Management Response to Draft Audit Report – "Improvements are Needed in the Telecommunications Data Network Management Program" (Audit No. 200120007)

Responsible Official(s) for Corrective Action #1

Chief, Information Technology Services
Director, Enterprise Operations
Director, Telecommunications Division M:I:T

Corrective Action Monitoring Plan

We will review the progress on these corrective actions monthly during operational reviews or specific briefings related to action on audit results.

Recommendation #2

The Deputy Commissioner for Modernization & Chief Information Officer should issue instructions to ensure network monitoring tools can electronically access all WAN equipment.

Assessment of Cause

This situation developed over several years in the IRS. The rapid changes in telecommunications services and the organization structure created an environment where no single office had clear accountability for the networks common to all IRS offices regardless of their location. This geographic-based organization structure also contributed to the establishment of multiple organizations performing similar functions. No single office or official had end-to-end responsibility for service-wide networks until our recent reorganization.

Corrective Actions for Recommendation #2

a. Complete the deployment of the Cisco Resource Manager Enterprise (CRME) capability to all Cisco network devices.

b. Complete the deployment and refinement of the Netview product included in the Tivoli suite of systems management software acquired by the IRS.

c. Obtain required community strings and passwords from technical staffs to implement all the tools mentioned above.

Attachment

Management Response to Draft Audit Report – "Improvements are Needed in the Telecommunications Data Network Management Program" (Audit No. 200120007)

Implementation Date for Corrective Action #2

		Proposed
a.	Complete CRME Deployment.	February 1, 2002
b.	Complete deployment of Netview.	March 1, 2002
c.	Obtain community strings/passwords.	Ongoing

Responsible Official(s) for Corrective Action #2

Chief, Information Technology Services
Director, Enterprise Operations
Director, Telecommunications Division M:I:T

Corrective Action Monitoring Plan

We will review the progress on completing corrective actions monthly during operational reviews or specific briefings related to action on audit results.

Recommendation #3

The Deputy Commissioner for Modernization & Chief Information Officer should define problem resolution timeliness standards for telecommunications contractors and employees and monitor the resolution of reported problems.

Assessment of Cause

No single document or procedural guide exists that defines telecommunications data network problems in terms of timeframes for resolution, escalation processes, or explains how to assess the severity of one outage or problem versus another.

Attachment

Management Response to Draft Audit Report – "Improvements are Needed in the Telecommunications Data Network Management Program" (Audit No. 200120007)

Corrective Actions for Recommendation #3

a. Review our existing problem identification processes and procedures along with those used by our network providers to evaluate and align with industry best practices.

b. Develop an IRS-wide procedural guide to assist network monitors in determining problem identification and severity (scope, work interruption, etc) of an outage. The procedural guide will assist them in providing network restoration timelines comparable to the commercial model.

c. Establish a process (methodology, sampling size, etc.) and cycle for post reviews of trouble handling within 6 months of the completion of the two preceding actions.

Implementation Date for Corrective Action #3

		Proposed
a.	Review existing processes.	April 1, 2002
b.	Develop and issue procedural guide.	July 1, 2002
c.	Establish post reviews.	October 1, 2002

Responsible Official(s) for Corrective Action #3

Chief, Information Technology Services
Director, Enterprise Operations
Director, Telecommunications Division M:I:T

Corrective Action Monitoring Plan

We will review the progress on completing these corrective actions during operational reviews or specific briefings related to action on audit results.

Recommendation #4

The Deputy Commissioner for Modernization & Chief Information Officer should incorporate problem resolution timeliness standards into the Network Event Status Report and ensure all problems are included in the daily status report.

Attachment

Management Response to Draft Audit Report – "Improvements are Needed in the Telecommunications Data Network Management Program" (Audit No. 200120007)

Assessment of Cause

The IRS uses the Treasury Communications System (TCS) Contract to acquire data network circuits and some hardware. In the past, we chose to restrict TCS access to routers, which made it difficult to quickly troubleshoot and resolve problems. The audit cites the TCS contract requirement calling for restoration of interrupted service within 8 business hours, however, in most cases; circuit problems do not cause service interruptions because of the redundant network paths. Finally, we track trouble tickets on network problems, produce internal reports on networks, and provide metrics and other information to Treasury on the performance of the TCS contractor.

Corrective Action for Recommendation #4

The Telecommunications Division recently granted TCS/TRW monitoring capability to Government Furnished Equipment (GFE) routers giving them an enterprise view of the IRS network. As part of our partnership commitment, TCS/TRW also granted IRS monitoring capability of TCS maintained devices. The Telecommunications Division will continue to work with Treasury and the TCS vendor to access responsiveness and timeliness.

The Telecommunications Division will improve problem resolution using the Enterprise Help Desk as the first stop for network problem reporting. All problems will be reported in the Information Technology Asset Management System (ITAMS) and tracked through the Help Desk tracking procedures. Using the Help Desk reporting feature, outages will be documented and compared to Service Level Agreement (SLA) standards that we are currently pursuing with Treasury and TCS vendors.

Implementation Date for Corrective Action #4

Proposed: June 1, 2002

Responsible Official(s) for Correction Action #4

Chief, Information Technology Services
Director, Enterprise Operations
Director, Telecommunications Division M:I:T

Corrective Action Monitoring Plan

We will conduct progress reviews during our monthly meetings between TCS Network Operations Center and the IRS Network Management Center.

Attachment

Management Response to Draft Audit Report – "Improvements are Needed in the Telecommunications Data Network Management Program" (Audit No. 200120007)

Recommendation #5

The Deputy Commissioner for Modernization & Chief Information Officer should conduct and document monthly network problem analyses to identify recurring problems.

Assessment of Cause

The IRS data infrastructure was completely revamped within the last two years. Many of the tools that collected data on the legacy network have become obsolete. Lack of data and inconsistencies across the network prevented the identification of recurring problems. Also, new databases of circuits and network components supporting the new infrastructure had to be completed prior to performing an analysis.

Corrective Action for Recommendation #5

The Telecommunications Division has established a monthly forum with Treasury and the TCS vendors to discuss network management issues. Identifying chronic network problems is a recurring agenda item for these meetings. Additionally, the Telecommunications Division will partner with Treasury and the TCS vendors to perform root cause analysis for repetitive problems. Using the root cause analysis data and the acquisition of new tools, the IRS and the TCS vendors will formulate action plans and promptly disseminate them to resolve persistent problems.

Implementation Date for Corrective Action #5

Proposed: January 1, 2002

Responsible Official(s) for Corrective Action #5

Chief, Information Technology Services
Director, Enterprise Operations
Director, Telecommunications Division M:I:T

Corrective Action Monitoring Plan

We will conduct progress reviews during our monthly Network Management Center operational reviews with the Telecommunications Director.

Attachment

Management Response to Draft Audit Report – "Improvements are Needed in the Telecommunications Data Network Management Program" (Audit No. 200120007)

Recommendation #6

The Deputy Commissioner for Modernization & Chief Information Officer should complete efforts to block Internet advertising.

Assessment of Cause:

The Telecommunications Division did not have policies and procedures, which required a periodic analysis of network traffic to identify unnecessary internet advertising.

Corrective Action to Recommendations #6:

We are continuing our efforts to block internet advertisements at the IRS firewall. The Telecommunications Division has prepared a plan requiring "content filtering" of internet traffic that will allow us to filter internet traffic and block internet advertisements. The Office of Cyber Security, which operates the firewall, endorses this approach. We are working to procure needed hardware and software.

Implementation Date for Corrective Action #6:

Proposed: February 1, 2002

Responsible Official for Corrective Action #6:

Director, Office of Cyber Security M:S:C

Corrective Action Monitoring Plan

None

Recommendation #7

The Deputy Commissioner for Modernization & Chief Information Officer should require periodic network traffic analyses and initiate corrective actions or communicate the results with responsible organizations.

Attachment

Management Response to Draft Audit Report – "Improvements are Needed in the Telecommunications Data Network Management Program" (Audit No. 200120007)

Assessment of Cause

Management has not issued policies and procedures requiring periodic analysis of network traffic to identify improvement opportunities. Periodic traffic analysis by the Telecommunications Division personnel may identify other low-cost opportunities to further improve the network's effectiveness.

Corrective Action for Recommendation #7

a. The Telecommunications Division is working with the Business System Modernization Program Office (BSMO) to establish a working relationship with the contractors to use the modeling tools to create a baseline of the current network and assist in periodically analyzing the network traffic.

b. The Telecommunications Division is establishing a capacity planning staff to use modeling tools to perform traffic analysis.

Implementation Date for Corrective Action #7

	Proposed
a. Periodically analyze the network traffic.	January 1, 2002
b. Establish capacity planning staff.	March 1, 2002

Responsible Official(s) for Corrective Action #7

Chief, Information Technology Services
Director, Enterprise Operations
Director, Telecommunications Division M:I:T

Corrective Action Monitoring Plan

We will review the progress on completing these corrective actions monthly during operational reviews or specific briefings related to action on audit results.

Recommendation #8

The Deputy Commissioner for Modernization & Chief Information Officer should issue and implement capacity planning policies and procedures for major network changes.

Attachment

Management Response to Draft Audit Report – "Improvements are Needed in the Telecommunications Data Network Management Program" (Audit No. 200120007)

Assessment of Cause

The Business Systems Modernization contractors were using the analytical modeling software to help determine future network capacity changes. However, we did not allocate resources to train Telecommunications Engineers or hire contractors with the required skills.

Corrective Action for Recommendation #8

a. The Telecommunications Division is working with the Business Systems Modernization Program Office (BSMO) to establish a working relationship with the contractor to use the modeling tools to create a baseline of the current network and assist in the capacity planning and modeling effort.

b. The Telecommunications Division is establishing a capacity planning staff to use modeling tools to perform required capacity planning work.

c. The Telecommunications Division is developing an IRS-wide policy and procedural guide that will place the capacity study on the quarterly schedule.

Implementation Date for Corrective Action #8

	Proposed
a. Use the modeling tool.	January 1, 2002
b. Establish a capacity planning staff.	March 1, 2002
c. Develop and issue policy and procedures.	September 1, 2002

Responsible Official(s) for Corrective Action #8

Chief, Information Technology Services
Director, Enterprise Operations
Director, Telecommunications Division M:I:T

Corrective Action Monitoring Plan

We will review the progress on completing these corrective actions monthly during operational reviews or specific briefings related to action on audit results.

Attachment

Management Response to Draft Audit Report – "Improvements are Needed in the Telecommunications Data Network Management Program" (Audit No. 200120007)

Recommendation #9

The Deputy Commissioner for Modernization & Chief Information Officer should ensure analytical modeling techniques are incorporated into network and system development planning methodologies.

Assessment of Cause

The Business Systems Modernization contractors were using the analytical modeling software to help determine the future network capacity changes. However, we did not allocate resources to train Telecommunications Engineers or hire contractors with the required skills.

Corrective Action for Recommendation #9

a. The Telecommunications Division is working with the Business Systems Modernization Program Office to establish a working relationship with the contractor to use modeling tools to create a baseline of the current network and assist in the capacity planning and modeling effort.

b. The Telecommunications Division is establishing a capacity planning staff to use modeling techniques.

Implementation Date for Corrective Action #9

	Proposed
a. Use the modeling tool.	January 1, 2002
b. Establish the capacity planning staff.	March 1, 2002

Responsible Official(s) for Corrective Action #9

Chief, Information Technology Services
Director, Enterprise Operations
Director, Telecommunications Division M:I:T

Corrective Action Monitoring Plan

We will review the progress on completing these corrective actions monthly during operational reviews or specific briefings related to action on audit results.

Attachment

Management Response to Draft Audit Report – "Improvements are Needed in the Telecommunications Data Network Management Program" (Audit No. 200120007)

Recommendation #10

The Deputy Commissioner for Modernization & Chief Information Officer should implement management oversight procedures to ensure employees and contractors follow the Change Management Plan (CMP).

Assessment of Cause

This situation developed over several years in the IRS. The rapid changes in telecommunications services and the organization structure created an environment where no single office had clear accountability for the networks common to all IRS offices regardless of their location. This geographic-based organization structure also contributed to the establishment of multiple organizations performing similar functions.

Corrective Action for Recommendation #10

a. Issue the final version of the Change Management Tracking System (CMT) document to establish procedures for making changes to the operational network.

b. Issue and implement Terminal Access Control Access Control System (TACACS) for all CISCO based network devices.

Implementation Date for Corrective Action #10

	Proposed
a. Issue CMT guidance and procedures.	December 1, 2001
b. Implement TACACS.	December 1, 2001

Responsible Official(s) for Corrective Action #10

Chief, Information Technology Services
Director, Enterprise Operations
Director, Telecommunications Division M:I:T

Corrective Action Monitoring Plan

We will review the progress on completing these corrective actions monthly during operational reviews or specific briefings related to action on audit results.

Attachment

Management Response to Draft Audit Report – "Improvements are Needed in the Telecommunications Data Network Management Program" (Audit No. 200120007)

Recommendation #11

The Deputy Commissioner for Modernization & Chief Information Officer should enhance change management oversight by:

a. Implementing the change management computer software already purchased.

b. Identifying, purchasing, and implementing software that is compatible with other vendors' hardware.

c. Revising the CMP to establish responsibility for reviewing change management records and taking corrective actions on unauthorized changes.

Assessment of Cause

This situation developed over several years in the IRS. The rapid changes in telecommunications services and the organization structure created an environment where no single office had clear accountability for the networks common to all IRS offices regardless of their location. This geographic-based organization structure also contributed to the lack of coordination over network assets. Modernization/Information Technology Services (MITS) has the tools and can implement them to solve this problem.

Corrective Action for Recommendation #11

a. Issue the final version of the Change Management Tracking System (CMT) document to establish procedures for making changes to the operational network.

b. Issue and implement Terminal Access Control Access Control System (TACACS) for all Cisco systems based network devices.

c. Research availability of tools for non-Cisco network devices and recommend appropriate acquisitions to cover those devices; subject to availability of funds.

Attachment

Management Response to Draft Audit Report – "Improvements are Needed in the Telecommunications Data Network Management Program" (Audit No. 200120007)

Implementation Date for Corrective Actions #11

	Proposed
a. Issue CMT guidance and procedures	December 1, 2001
b. Implement TACACS	December 1, 2001
c. Research availability of tools and acquire approved tools (subject to funds availability)	March 1, 2002

Responsible Official(s) for Corrective Action #11

Chief, Information Technology Services
Director, Enterprise Operations
Director, Telecommunications Division M:I:T

Corrective Action Monitoring Plan

We will review the progress on completing these corrective actions monthly during operational reviews or specific briefings related to action on audit results.